

SOME NOTES ON COCCIDÆ.

BY T. D. A. COCKERELL.

The following paper is the result of some work done in the Division of Entomology, Department of Agriculture, while on a brief visit in the spring of 1899. I am greatly indebted to Dr. Howard and his staff for the facilities and assistance kindly given me.

LLAVEIA Sign.

Ann. Soc. Ent. France, 1875, p. 370.

Ortonia Sign., Ann. Soc. Ent. France, 1875, p. 367 (not *Ortonia* Wood, 1869; nor *Ortonia* Nich., 1873).

Protortonia Twms., Jn. N. Y. Ent. Soc., 1898, p. 169.

These are all one genus, the species of which, when adult, have normally 11-jointed antennæ. I believe it will yet be necessary to sink *Llaveia* as a synonym of *Monophlebus*; especially since Herrera (*La Naturaleza*, 1884) says the ♂ of *Llaveia axin* has eight "cerdas terminales" on the abdomen, which I suppose to be the filiform processes of the ♂ *Monophlebus*.

Mounts made by Mr Pergande from topotypes of *Ortonia mexicanorum* and *primitiva* show 11-segmented antennæ. The locality of *mexicanorum* is Mixcoac, not "Misebac." Dugès described the antennæ of the ♀ *Llaveia axin* as 10-segmented, but Herrera declares there are 11 segments. I have only seen the third stage (9-segmented) and larva. The following table will separate the adults of *Llaveia*:

Size very large; length 15 mm. or over.	1
Smaller, length of adult ♀ cleared and mounted 7 mm.	3
1. Pubescence scanty; length 15-18 mm.; antennæ short, segments broader than long, except the last,	
<i>Llaveia bouvari</i> (Sign.).	
Pubescence abundant; length 23-25 mm.	2
2. Legs and antennæ reddish; Mexico. <i>Llaveia axin</i> (Llave).	
Ecuador; separated by no tangible characters from the last, so far as known; perhaps identical with it.	
<i>Llaveia uhleri</i> (Sign.).	

3. Skin very thickly covered with short hairs; antennæ long, none of the segments, unless the first, twice as broad as long; those after the sixth conspicuously longer than broad; eleventh narrow, cylindrical, 192μ long. *Llaveia primitiva* (Twins.).
 Skin with very many round glands, but hairs very minute, sparse, scarcely noticeable; antennæ shorter, the first 8 segments twice as broad as long; 9 and 10 considerably broader than long; 11 oval, . . . *Llaveia mexicanorum* (Ckll.).

The antennæ and legs of *primitiva* and *mexicanorum* are very dark sepia brown, even in the immature stage; this is very different from the clear ferruginous of *axin*. The antennæ of the third stage of *axin* are of the type of *mexicanorum*, but the skin is very hairy as in *primitiva*.

Margarodes polonicus (Linn.).

Porphyrphora polonica Auct.

The genus *Porphyrphora* Brandt is essentially the same as *Margarodes*, the latter name having priority. There is a good figure of both the ♀ and the "pearl" of *M. polonicus* in Van F. Houttuyn's *Natuurlyke Historie*, 1766, Vol. 10, pl. lxxxiii.

COCCUS Linné.

Syst. Nat., Ed. x, 1758, p. 455.

The first species mentioned is *hesperidum* (*Lecanium*). The last is *cacti*. The other species belong to *Chrysomphalus*, *Kermes*, *Pulvinaria*, *Mytilaspis*, *Chionaspis*, *Eulecanium*, *Ceroplastes*, *Porphyrphora* and some Dactylopiine genus. The *Coccus cacti* of *Syst. Nat.*, ed. x, is a Monophlelid, so the *Coccus* of Signoret is not the Linnean genus in any sense. The first to divide *Coccus* L. was Geoffroy, who used *Chermes* for the Lecaniinae and Diaspineæ (this is not the true *Chermes* Linn., which is *Psylla*), and restricted *Coccus* to the *Coccinæ*. Under *Coccus* he described three species, *C. adonidum*, etc., which is a *Dactylopius*, *C. phalaridis* which is some Dactylopiid, and *C. ulmi*, etc., which is *Gossyparia*. Only one of these is in the *Syst. Nat.*, ed. x, and that is *phalaridis*, which thus becomes the type of the genus. For a description of *C. phalaridis* we may refer to the *Fauna Suecica*, ed. 1761, p. 266. It is said to live at the roots of *Phalaris canariensis*, and to be attended by *Formica rubra*. The description runs: "Animal magnitudine seminis cannabis, exalbidum, solis pedibus parum

incarnatis. Antennæ vix corporis $\frac{1}{4}$ partem adtingunt. Rostrum inflexum. Anus retusa, vix villosa." This should be easily identified when collected again in Sweden; most likely it is a *Ripersia*. The insect seen by Geoffroy was possibly not the same, as he says it is "un peu couleur de chair." Lichtenstein suggested that *phalaridis* might well be the *Coccus radicum-graminis* Fonse., for which he proposed the generic name *Fonscolombia*.

Coccus Signoret will stand as *Pseudococcus* Westwood (not *Pseudococcus* Sign., which is *Phenacoccus* Ckll.).

Coccus adonidum Gmelin.

There is no such thing as *Dactylopius adonidum* Linné. In the early editions of the *Fauna Suecica* Linné had a *Pediculus adonidum*, but finding out that it was not a *Pediculus*, and apparently not knowing what to do with it, he omitted it altogether from the *Syst. Nat.*, ed. x, from which our nomenclature starts. I also fail to find any trace of it in the twelfth edition, but in Gmelin's edition *Coccus adonidum* appears with a description. The description, however, refers to a longitudinal dorsal elevated line, and other characters which belong evidently to some *Orthezia*!

Geoffroy's "Coccus adonidum corpore roseo, farinaceo, alis setisque niveis," is, on the other hand, evidently a *Dactylopius*, but his name is not a binomial.

Dactylopius adonidum must therefore disappear from our lists.

Coccus cacti Linné.

Syst. Nat., Ed. x, 1758.

Some of the works cited by Linné (*e. g.*, Réaumur) relate to the true cochineal insect; but the whole of the Linnean description pertains to a Monophlebid! The specimens described were collected in the island of St. Eustache by Daniel Rolander, and sent alive to Upsala in 1756. At the same time Rolander sent a number in alcohol to DeGeer, who (*Mém.*, Vol. vi, p. 449) gave a full account of them, with a figure. The alcoholic specimens were yellow ochre or pale rose; Linné, having seen them alive, says the abdomen is purplish. The antennæ and legs are black; antennæ 11-segmented; mouth parts present. The shape is long oval, like *Llaveia* or *Ortonia*. Linné says nothing about any ovisac, or cottony covering, so it was doubtless absent.

This species seems not to be identical with anything known to

modern coccidologists, but it is probably a *Llaveia* or closely related form. It will doubtless be rediscovered when looked for in the type locality.

The cochineal insect can stand as *Pseudococcus cacti* (Burm., *Handb. der Entom.*, 1839, Vol. 2, p. 72). Burmeister's citations of literature belong to the cochineal, and he ignores the *Syst. Nat.*, ed. x. His description of the ♂ agrees with the cochineal, but his ♀, with caudal setæ, is doubtful. The locality is given as Mexico, and it is definitely stated that it is the animal which produces the scarlet pigment.

SPHÆROCOCCOPSIS n. g.

Type *S. inflatipes* (*Sphærococcus inflatipes* Maskell, Trans. N. Z. Inst., xxv, p. 238).

This is widely separated from *Sphærococcus* by the presence of well-developed legs in the adult ♀; the first four small, the hind pair very large. The margin is beset with spines.

PHÆNICOCOCCUS n. g.

Type *P. marlatti* n. sp.

Adult ♀. Skin tuberculate, but without conspicuous glands; spiracles small; antennæ reduced to a mere tubercle; otherwise like *Sphærococcus*. The anal ring is hairless in larva and adult.

Larva with four long caudal bristles instead of only two. No lateral or dorsal spines.

Phœnicococcus marlatti n. sp.

Adult ♀; broad oval or plum-shaped, wine-red when alive, (fide Marlatt), 1 to $1\frac{1}{4}$ mm. long; occurring packed in great numbers in little cavities about 10 or 12 mm. long by 4 or 5 broad on the midribs of the leaves, communicating with the air by a narrow longitudinal slit.

Skin transparent after boiling, with only a faint brown tinge, its surface beset with numerous hyaline tubercles, which make it seem tessellate, but no spines or hairs, and only a very few scattered glands, except laterad of the spiracles, where there are numerous small round glands grouped more or less in a semicircle. Spiracles formed as in *Sphærococcus*, but small. Antennæ mere minute dark protuberances. Mouth parts well developed. Rostral loop bent suddenly near the base.

Larva elongate, more than twice as long as broad, without lateral or dorsal spines; antennæ 6-segmented, formula 612 (35) 4; 6 long,

cylindrical; 1 very large. Segment 6 has two very long hairs at the end. Interval between the antennæ less than the greatest diameter of the first segment. Caudal tubercles little produced; each with two bristles. Femora much swollen, legs otherwise ordinary.

Hab.—On date palms (*Phoenix*) imported from Algeria; found by Mr. C. L. Marlatt, who made some study of it years ago. Mr. Marlatt informs me that on the living plants the slight swellings containing the insects are extremely inconspicuous, and very likely to be overlooked even on close examination.

Since the above description was written, *P. marlatti* has been found by the writer in great numbers on the insides of the sheathing bases of the leaves of a date palm just imported from Algeria. Here it is not beneath the epidermis.

DACTYLOPINE GENERA.

After a consideration of the larval characters, I am willing to recognize five genera of Dactylopiini with the legs and antennæ rudimentary or absent. It is interesting that the larvæ of these forms, which are so degenerate in the adult stage, differ more than do the larvæ of ordinary coccids; and, moreover, their differences are just such as separate the adults of the genera which retain their legs and antennæ to the last.

The following table will separate the genera mentioned:

Newly hatched larva elongate, after the manner of <i>Rhizæus</i> and <i>Pergandiella</i> , antennæ 6-segmented,	1
Newly hatched larva oval or elliptical,	2
1. Terminal antennal segment of larva oval, little longer than the one before.	PSEUDOLECANIUM Ckll.
Terminal antennal segment of larva very large, as long as the three before.	CHETOCOCCUS Maskell.
2. Larva with 5-segmented antennæ; anal ring of adult with 4 hairs.	CRYPTOCOCCUS Dougl.
Larva with 6-segmented antennæ; anal ring of adult with 6 hairs.	ANTONINA Sign.
Larva with 7-segmented antennæ; anal ring of adult and larva with 17 hairs.	KERMICUS Newst.

Sphærococcus tokionis Ckll., Bull. 4, Tech. Ser., Div. Ent., will stand as *Pseudolecanium tokionis*.

Fonscolombia radicum-graminis (Fonse.).

Fonscolombia graminis Licht., Ent. Mo. Mag., 1877, July, pp. 34, 35.

This insect, described by Fonscolombe in 1834, is found in France at the roots of cereals. The ♀ has 6-jointed antennæ, and the ♂ is apterous. Lichtenstein suggests that this may be the *Coccus phalaridis*, but this is at present doubtful. Should it be *phalaridis*, it will belong to *Coccus* L.; but otherwise Lichtenstein's genus *Fonscolombia* is valid, and has priority over *Pseudochermes* and *Apterococcus*, proposed for a congeneric species.

Fonscolombia fraxini (Kalt.)

Ripersia (*Apterococcus*) *fraxini* (Newst.).

This insect was first described by Kaltenbach in 1874. In 1895 Nitsche proposed for it the subgeneric name *Pseudochermes*. Newstead, when describing the insect as new, used the same specific name as that of Kaltenbach.

Phenacoccus mespili.

Signoret in 1875 described this insect for the first time, but called it *Pseudococcus mespili* Geoffroy. The *Chermes mespili serico albo* of Geoffroy, as well as the *Coccus mespili* Gmelin (*Syst. Nat.*, 1788), based upon it, are manifestly referable to *Pulvinaria*. Geoffroy says his insect appears not to differ from his *Chermes curpini serico albo*, which is also a *Pulvinaria*. Signoret also cites Fonscolombe's supposed *Coccus cratægi*, described in 1834, but that is also a *Pulvinaria*. Signoret has suggested that the *Coccus pruni* Burm., 1849, may be *Pseudococcus mespili*. The description of Burmeister is quite inadequate to demonstrate this, and differs in the statement that the insect is greenish gray, *P. mespil* Sign. being reddish. The *Phenacoccus* is therefore nameless, but it is here proposed to use for it the name *mespili*, which will not conflict with Geoffroy's name, the latter pertaining to a different genus.

Phenacoccus (?) **farinosus** (Gmel.).

Coccus farinosus alni, DeGeer, Mem., Vol. vi, 1776, p. 442, pl. 28, figs. 17-20.

Coccus farinosus, Gmelin, *Syst. Nat.*, Ed. xiii, 1788, p. 2220.

This is a Dactylopiine found on the alder; clear, rather reddish, brown, mealy-farinoso, eventually covering itself, except the head, with a cottony sac, in the hind part of which the eggs are laid. In the subadult stage it has short lateral tassels, but no long caudal

ones. This should be easily recognized when found again in Europe.

Rhizæus (?) terrestris (Newst.).

Ripersia terrestris Newst., Ent. Mo. Mag., 1895, p. 213.

This has in common with *Rhizæus falcifer* the peculiar elongate shape, the 5-segmented antennæ, the elongated mentum, and the prominent caudal tubercles. Newstead figures no eyes, nor mentions them. The terminal segment of the antenna has not the curious falciform spines observed in *R. falcifer* and *eloti*.

Rhizæus (?) mammillariæ (Targ.-Tozz.).

Dactylopius mammillariæ (Targ.-Tozz.).

Westwoodia sp. n. (?), Targ.-Tozz., Annali di Agricoltura, 1884, pp. 402, 403, figs.

Found at the roots of *Mammillaria*. Targioni-Tozzetti at first called it *Dactylopius mammillariæ*, but later left it without a specific name. He says his material was immature, but the tibia is considerably larger than the tarsus, pointing to a subadult condition at least. The insect differs from *Pergandiella* in any stage by the elongate mentum; in this it agrees with *Rhizæus*, but it differs from that in having well-developed eyes, and in lacking the falciform spines on the antennæ. The antennæ, though 6-segmented, resemble more those of *R. (?) terrestris* than typical *Rhizæus* or *Pergandiella*. Apparently this insect will form a new genus.

Oudablis parietariæ (Licht.).

Boisduvalia parietariæ Licht., Bull. Soc. Ent. France, 1881, p. cxv.

This species has been overlooked by later writers. The ♂ is clear red; the ♀ mealy white. It is found on *Parietaria diffusa*.

Sugarcane Mealy-bugs.—In the collection of the Division of Entomology at Washington I find mounted specimens of *Dactylopius calceolarie* and *D. sacchari* from new localities, identified by Mr. T. Pergande. While recording these, I take the opportunity of giving detailed measurements, not hitherto published for these species. It will be seen that although superficially similar and having similar habits, the insects are very distinct in structure.

Dactylopius calceolarie Mask.

On sugarcane, Florida, November 7, 1898 (No. 6,832).
New to the U. S.

Shape long oval. Measurements in μ :

Middle leg: coxa, 197; femur + trochanter, 331; tibia, 223; tarsus (very short!), 90; claw, 30.

Antennal segments: (1) 60 long and 86 broad, (2) 68-70 long, (3) 39-43, (4) 30-34, (5) 43, (6) 32-39, (7) 43-47, (8) 96-100.

The specimens were sent to the Div. Entomology by R. E. Rose, from Narcoosee, Fla.

Dactylopius sacchari Ckll.

On sugarcane, Bayamon, Porto Rico, January, 1899, (*A. Busck.*).

Females full of embryos. Measurements in μ :

Middle leg: coxa, 133; femur + trochanter, 236; tibia, 146; tarsus, 73; claw, 30.

Antennal segments: (1) 34-43 long and 82 broad, (2) 39-43 long, (3) 26-30, (4) 30-39, (5) 26-30, (6) 34-39, (7) 77-93.

The antennæ have only 7 segments.

PERGANDIELLA n. g.

A Dactylopiine coccid with a long, parallel-sided body; antennæ 8-segmented, stouter and shorter than in *Dactylopius*; eyes present; anal ring with six large bristles; mentum short; no projecting caudal lobes. Type *P. americana* n. sp. Includes also *P. perrisii* (*Westwoodia perrisii* Sign.) from France. This is identical with *Westwoodia* Sign., *Signoretia* Kraatz, and *Bergrothia* Kraatz; but all these names are preoccupied. I formerly misunderstood its generic characters, and was later led thereby to place it as a synonym of *Dactylopius*. It is appropriately dedicated to Mr. Theo. Pergande, who has all along maintained its validity, and who discovered the type species.

Pergandiella americana n. sp.

♀ (Mr. Pergande's mount).—Length $3\frac{2}{3}$, breadth $1\frac{1}{4}$ mm.; eyes distinct; caudal tubercles not produced, each with many small round glands, and a pair of short, stout spines, also about 15 short hairs, and one long one, this last like the bristles of the anal ring, but longer. Skin with small round glands, and scattered hairs, not numerous enough to form a noticeable pubescence; rostral loop reaching to about midway between first and second pairs of legs;

mentum broader than long, breadth 104, length 92 μ ; legs very sparsely hairy; hairs on tibia and tarsus very short; claws simple, ordinary. Bristles of anal ring 108 μ long.

The following measurements of the legs and antennæ are in μ :

Antennal segments: (1) 52, (2) 44-48, (3) 28-32, (4) 20-24, (5) 32, (6) 22-24, (7) 28-32, (8) 76-88. Formula 812 (537) (64).

Middle leg: coxa, 116; femur + trochanter, 240; tibia, 168; tarsus, 84; claw, 22. Diameter of femur, 72; of tibia, 36.

Anterior leg: tibia, 140; tarsus, 80.

Posterior leg: tibia, 200; tarsus, 92.

Larva.—Dactylopiine; antennæ 6-segmented, 6 longer than $3 + 4 + 5$, as 13 is to $10\frac{1}{2}$; tarsus, excluding claw, longer than tibia, as 11 is to 10; caudal tubercles slightly produced; mentum not very long, length to breadth as $11\frac{1}{2}$ is to 10.

Hab.—Washington, D. C., on ash, November 4, 1898 (*Pergande*, Div. Ent., No. 8,200). Differs from *P. perrisii* principally by its smaller size, scarcely pubescent legs, and in being arboreal, whereas *perrisii* was found on grasses. Its color is also different. This interesting insect ought to have been published under Mr. Pergande's name, as he had carefully examined it and noted its peculiarities before I saw it. It is only after urging him to publish it, without result, that I now, with his consent, make it known. I am permitted to supplement my description by the following extract from Mr. Pergande's notes:

“ Found in cracks of bark on the trunk of an ash on the Agricultural Department grounds three specimens of a species of *Westwoodia*, one of them still crawling about. The others were infested by a hymenopterous parasite, though both were still living. The active ♀ was very slender, about 4 mm. long, by 1 mm. in diameter, and of a brownish-red color but covered with a mealy excretion which gave it a grayish or moldy appearance. The other two were in addition to the mealy substance covered by a woolly excretion, which was rather sparse anteriorly, but became very dense toward and around the end of the body. . . . There was also found in one of the cracks a mass of white and woolly excretion containing eggs and young larvæ of this species, all of which were of a pale purplish color. . . . With the eggs were also found one minute specimen of a bright red species of *Scirus*, and one

minute species of Gamasidæ, of a faintly yellowish color. They were feeding on the eggs" (Pergande MS.).

Gossyparia spuria (Modeer).

Coccus ulmi, Olivier, Encycl. Meth., Vol. vi, 1791, p. 97.

This species was well figured by Réaumur, and is the *Coccus ulmi*, *corpore fusco, serico albo*, of Geoffroy. Geoffroy's name is not a binomial, so the proper name of the insect is that given by Modeer, which was in general use before Signoret's time.

The *Coccus alni* Modeer, 1778, is a *Lecanium*, and has nothing to do with *Gossyparia*; see Douglas, *Ent. Mo. Mag.*, September, 1886, pp. 80, 81.

Eriococcus palmeri n. sp.

♀.—Sac $1\frac{1}{2}$ –2 mm. long, of the usual oval shape, of closely woven pure white cottony secretion, with many loose threads on the surfaces producing a kind of pubescence. Caudal aperture quite large.

♀.—Boiled in KHO, does not stain the liquid. Antennæ uniformly 6-segmented, with 3 longer than the subsequent segments together. 2, 1 and 6 subequal in length; 4 and 5 subequal and shortest. Antennæ and legs pale brown. Dermal spines crowded and very large. Femur rather stout; tibia and tarsus long and slender, tarsus somewhat longer than tibia, with two long bristles on its inner side. Claw long, curved. All the digitules filiform, those of the claw extremely slender, those of the tarsus extending a little beyond end of claw. Claw with a minute denticle on the inner side just before the tip. Caudal tubercles long, cylindrical.

The following measurements are in μ :

Dermal spines, 37–47.

Antennal segments: (2) 32, (3) 75, (4) 22, (5) 22, (6) 35.

Middle leg: coxa, 120; femur + trochanter, 180; tibia, 104; tarsus, 112; claw, 40

Hind leg: tibia, 116; tarsus, 120; claw, 36.

Hab.—Collected by Dr. Palmer on Carmen Island, off the east coast of Lower California, February, 1891. Found on *Bourreria sonora* Wats., and also on *Euphorbia blepharostipula* Millsp. Types in Coll. U. S. Dept. Agric., Div. Ent., No. 4898. This is the smallest American *Eriococcus*, but it is not so small as *E. leptospermi* Maskell.

Eriococcus ericæ Sign.

Finding in the collection of the Dept. Agriculture a slide of this species from F. Richter, of Montpellier, I give the measurements (in μ) of the antennæ and legs.

Antennal segments: (1) 30, (2) 36, (3) 36, (4) 21, (5) 18, (6) 28.

Legs: coxa, 86; femur + trochanter, 133; tibia, 73; tarsus, 109; claw, 12.

Longest dermal spines about 43 μ .

Asterolecanium epidendri (Bouché).

Lecanium epidendri Bouché, Stett. Ent. Zeit., 1844, p. 300 (not *L. epidendri* Bouché, Stett. Ent. Zeit., 1851, p. 112).

The ♀ described by Bouché is evidently our *A. oneidii*; it is said to be probably from the West Indies. Bouché's ♂ is perhaps some other species.

Asterolecanium rhamnii Kieffer.

Bull. Soc. Ent. France, 1898, pp. 214, 215, figs.

Found on *Rhamnus* in Algeria, forming galls. This supposed Coccid is manifestly a psyllid, and Mr. Schwarz, to whom I showed the description and figures, immediately recognized it as a *Trioxa*.

Asterolecanium variolosum (Ratzeburg).

Asterolecanium quercicola Sign. et Auctt. (not *Lecanium quercicola* Beh.).

Coccus variolosus "Ratzeburg MS.," Hagen, Canad. Entom., 1887, p. 60 (no descr.).

Lecanium quercus "L." (not of Linné), Altum, Forstzoologie, iii, Insecten, 1881, p. 365.

Coccus variolosus Ratzeburg, Tharander Jahrbuch, xx, 1870, p. 187 (not seen; *vide* Judeich and Nitsche).

Coccus quercicola "Sign.," Judeich and Nitsche, Lehrbuch der Mitteleur. Forstinsektenkunde, Vol. ii, 1895, p. 1252 (good figures).

Asterodiuspis variolosus Boas, Dansk Forstzoologi, 1896-98, p. 395, fig.

Bouché described his *quercicola* as elevated, rough and dark brown. Whatever it may have been, it was hardly the *Asterolecanium*. The name proposed by Ratzeburg is very appropriate.

KERMES Boitard.

Mannel d'Entomologie, Vol. ii, 1828, pp. 171, 172.

The name *Kermes* had been used in a popular sense from early times, but Boitard is the first author I find using it as a genus in scientific nomenclature. He includes in it *Kermes variegatus*, *K.*

ilicis and *K. reniformis*, as well as species of *Lecanium*, etc. Mr. T. Pergande suggests that *Kermes* is in reality allied to *Eriococcus*. This had not occurred to me, but after going over the characters with this thought in mind, I am inclined to agree with him.

***Kermes ilicis* (L.).**

Coccus ilicis L., Syst. Nat., Ed. x, 1758, p. 455.

Linné gives no description, but cites Réaumur. The insect described and figured by Réaumur is the globular black species, later named *K. bauhiniæ*, not the *K. vermilio*. The latter therefore remains valid.

***Kermes quercus* (L.).**

Coccus quercus L., Syst. Nat., Ed. x, 1758, p. 455.

Linné gives no description, but cites, "Réaumur. ins. 4, t. 6, f. 1-4, and alia f. 8, 9, 10.

Réaumur's figures 1-4 represent *Kermes reniformis* of Signoret and authors, which must therefore fall as a synonym of *K. quercus*. The figures 8, 9, 10, are of a large *Pulvinaria*, also found on oak.

Kermes quercus Newst. MS. will need a different name. The *Lecanium quercus* "L." of Signoret is not the Linnean insect.

***Pseudokermes armatus* (Ckll.).**

Lecanium armatum Ckll., Am. Mag. N. Hist., June, 1898, p. 436.

Mr. Pergande made a mount of the second stage from out of the original lot. It is 1 mm. long approximately, and has the legs and antennæ mere stout, conical protuberances, extremely small; skin with numerous figure-of-8 glands; anal plates large, mouth parts well-developed.

***Lecanium coffeæ* Walker.**

List Homop. Ins. B. M., 1852, p. 1079.

This is said to have transverse ridges, which suggests *olea*; but it is flat and only 2 mm. long, so it must be in the second stage only, and therefore may be *hemisphaericum*. Tradition in Ceylon identifies it with *hemisphaericum*, and I have used the name *coffeæ* for that insect accordingly. Mr. Pergande, however, tells me he saw specimens in the Berlin Museum labelled *coffeæ*, and believed to be authentic, and they were *olea*. On the whole, the name *coffeæ* had better be dropped.

Lecanium ulmi (Gmelin).

Coccus ulmi Gmel., Syst. Nat., p. 2217 (not *Coccus ulmi* L.).

This is the *Lecanium fasciatum* Costa, with transverse brown bands in the manner of *L. perornatum*. It is DeGeer's *Coccus ovatus albus fusco transverse striatus, ulmi*, figured on pl. 28, f. 7. It is also the *Chermes ulmi rotundus* of Geoffroy, and Olivier's *Chermes ulmi*. Olivier says he found it in Holland in May, 1735.

Douglas (*Ent. Mo. Mag.*, September, 1886, p. 79) remarks that in England are found only wholly brown scales of *L. ulmi*, such as were also known to Signoret in France. He queries whether the bands may not be peculiar to the immature stage, but it seems probable that they are retained to the last, as in *L. perornatum*. In that case the English *L. ulmi* will require a new name, being apparently a distinct species; unless, as Douglas suggests, it may be identical with *L. alni* (Modeer).

Lecanium liriiodendri (Gmel.).

Coccus liriiodendri Gmelin, Syst. Nat., 1788, p. 2220.

It has long been supposed that this might be identical with our *L. tulipifera* Cook, but nobody appears to have been able to consult the description (*Hamburgisches Magazine*, xii, 1753, pp. 3-24) quoted by Gmelin, on which the specific name is based. Fortunately I have been able to obtain the work at the Library of Congress; it proves to be an article by Dr. John Hill, of London, relating to a *Lecanium* he found on the tulip tree in a plantation of American trees at Goodwood; and afterwards, on the same kind of tree, in Burlington Gardens, Chiswick, England. Not being able to make very much out of the article myself, I asked Mr. Pergande to read it, which he did, also without any definite result. It is plain that the insect was a *Lecanium*, and it is perhaps probable that it was *L. tulipifera*, but the description is so vague, besides containing some apparently inaccurate statements, that there can be no certainty. It is, however, very desirable that some one should ascertain whether any tulip trees (*Liriiodendron*) are still living at the places named, and, if so, whether they are infested by this *Lecanium*.

Lecanium castilloæ Ckll.

I have examined a mount of the second stage, prepared by Mr. Pergande from some of the original material collected by Prof.

Townsend on *Castilloa* at Frontera, Mexico. The margin has numerous short rather thick spines, 10 μ long and 21 μ apart. Stigmatal spines in threes, two very short, about 17 μ , the other very long, 73 μ . Close to the margin, on each side, are five well-marked round glands, 14 μ diam., consisting of a small ring within a larger. Antennæ well developed, 7-segmented; the segments measure thus in μ : (1) 26-34, (2) 34, (3) 60-64, (4) 73-77, (5) 34-39, (6) 30-34, (7) 43-51.

Anterior legs with the tibia, 94 μ ; tarsus (excl. claw), 81 μ ; width of femur, 51 μ .

PULVINARIA.

The following measurements will assist in the determination of the species; they are all in μ :

Antennal Segments.

	1	2	3	4	5	6	7	8
<i>P. eupania</i> Ckll., on akee, Kingston, Ja- maica (Ckll.)..	39	39	77	43	39	26	26	43
<i>P. aurantii</i> Ckll., on orange Tokio, Japan (Takahashi) ..	34-47	47-55	64-77	47-51	43-51	21-26	26	47-55
<i>P. psidii</i> Mask., on coffee (?), Kailua, Ha- wail, 1893 (Div. Ent.)...	39	64	111-107	60-64	64	39-43	34	55
<i>P. ribesiae</i> Sign., Lancaster, England (Newstead)...	(?)	47	73	73	55	34	30	47
<i>P. flavicans</i> Mask., Murray Bridge, Austr- alia (Koebele) ..	39-43	43	47	39-43	34-47	21-26	17-21	34-39
<i>P. "camellicola,"</i> on <i>Euony- mus</i> , Macon, Georgia, 1892 (Bonn.).....	(?)	43-51	55-64	55	30-34	30	26	39-51
<i>P. bigeloviae</i> Ckll., Los An- geles, Califor- nia (Div. Ent.).	(?)	51	60	51	43	39	30	39

Legs of the same Specimens.

	Length of Tibia.	Length of Tarsus (excl. claw).	Breadth of Femur.
<i>P. cupania</i> (anterior leg).....	172	94	68
<i>P. aurantii</i> (anterior leg).....	155	86	73
<i>P. psidii</i> (anterior leg).....	258	107	90
<i>P. ribesiae</i> (anterior leg).....	180	103	69
<i>P. "camellicola"</i>	163	82	73
<i>P. bigeloviae</i> (middle leg).....	193	124	90

P. cupania, *aurantii* and *psidii* are superficially similar, and are liable to be confused. In *cupania* and *psidii* the marginal spines are about 21 μ long, and more or less fimbriate at the ends; in *aurantii* they are simple, only those next to the spiracular incisions being slightly flattened and inclined to be fimbriate at the ends. On the other hand, by the antennæ *aurantii* and *cupania* are close together, and *psidii* differs greatly by the long 3, as also in the very long tibia.

The marginal spines of *flavicans* are sharp and quite simple; those of *ribesiae* are also quite simple, very slender, the longer ones 43 μ .

The marginal spines of the "*camellicola*" are simple, very slender, 39–60 μ apart, and 34–47 μ long.

The *bigeloviae* has the antennæ practically as in "*camellicola*," but the legs will distinguish it.

The species marked "*camellicola*," may possibly be the insect intended by Signoret, but his description does not agree. I have considered it rather a form of my *P. simulans*; vide *Canad. Entom.*, 1895, p. 258.

***Aulacaspis coccois* (Licht.).**

Diaspis coccois Licht., Bull. Soc. Ent. France, 1882, p. xxxvi.

This is presumably the insect afterwards described by Morgan as *D. tentaculatus*. The exuviae are distinct and almost central.

***Chrysomphalus aonidum* (Linn.).**

Coccus aonidum L., Syst. Nat., Ed. x, p. 455.

The description reads: "Habitat in Asiæ arboribus semper-
virentibus ut in Camellia, aliisque. Præcedenti [*hesperidum*] minor,

sed similis. Testa orbiculata, planiuscula, atro-purpurascens, centro f. vertice tuberculo rotundo rubro quod in senescentibus aperitur." This seems to me to apply excellently to one thing, and one only, viz., *Chrysomphalus ficus* Ashm. Signoret naturally could not recognize the species, because he did not have it. It seems probable that the insect is after all a native of Asia, with *C. dictyospermi*; while the group of *C. perseae*, etc., is truly neotropical.

Chrysomphalus rossi Maskell.

Manila, Philippine Is., on an orchid, quarantined by Mr. A. Craw at San Francisco. The material was very scanty, but was examined by Mr. Marlatt and the writer, and identified as *rossi*. This is the first coccid record from the Philippines.

Aspidiotus acuminatus Targ.-Tozz.

This species was omitted from my Check List. It is a species of *Hemibelesia*, and, so far as I can see, identical with *A. rapax* Comst.

Aspidiotus euonymi Targ.-Tozz.

This is also an *Hemibelesia*, and has been referred to *A. rapax*. It is, however, one of the *A. cydonia* group, having four groups of circumgenital glands.

Aspidiotus saccharicaulis Zehntner.

This is an *Odonaspis*, and hardly more than a variety of *A. secretus*. The following table will separate the three races of *secretus*:

- (1) Two groups of circumgenital glands, not connected above by a line of glands. . . . *A. secretus* var. from Ceylon (Green).
- (2) Groups of circumgenital glands connected above by a line of glands. *A. secretus* Ckll., type from Japan.
- (3) Groups of circumgenital glands connected above by a median group which is three deep in the middle.

A. secretus race *saccharicaulis* (Zehnt.).

A new locality for *A. secretus* is Honolulu, Hawaii, on bamboo, 1899 (*Geo. Comp*, in coll. Div. Ent. Dept. Agric.).

Mytilaspis abietis Sign.

Signoret, in *Bull. Soc. Ent. France*, 1882, p. clxxxiv, admits that his "*Mytilaspis abietis* Schr." is not Schrank's insect, the

latter being an *Aspidiotus*. He then proposes that the name *abietis* be retained for the *Mytilaspis* with himself as its author. This must hold, and the name *confusus*, proposed by Horváth, will fall as a synonym.

Mytilaspis ulmi (L.).

Coccus ulmi Linné, Syst. Nat., Ed. x, 1758, p. 455.

Mytilaspis pomorum Bouché et Auctt.

Linné gives no description, but cites, "Réaum. ins. 4, t. 2, 5. f. 5-7, and alia t. 7. f. 1-10." Réaumur's pl. 5, figs. 5-7, represent the *Mytilaspis* of the elm, which is now considered identical with that of the apple; they are, in fact, the very figures which Geoffroy cites for his *Coccus arborum linearis*. Réaumur's pl. 7, figs. 1-10 represent *Gossyparia spuria (ulmi)*.

Mytilaspis beckii (E. Newman).

Coccus beckii E. Newman, Entomologist, Feb., 1869, pp. 217, 218.

Mytilaspis citricola (Pack.), Comst. et Auctt.

The name *beckii* is based on Beck's figures and notes, which are unmistakable. Newman erroneously supposed the apple *Mytilaspis* to be the same.

Parlatoria proteus var. **crotonis** Dougl.

Ent. Mo. Mag., April, 1887, p. 242.

The species found so commonly on crotons, described as *crotonis* (*pergandei* var.) by the present writer, appears to be the same as that of Douglas. I had overlooked the latter's article on the subject.

Diaspis pentagona Targ.-Tozz.

Rivista di Bachioltura, 1886, No. 11; reprinted in Bull. Soc. Ent. Ital., 1887, pp. 184-186.

n. syn. *Diaspis amygdali* Tryon.

The probability of this synonymy had occurred independently to Mr. Marlatt and the present writer; an examination of Italian material of *pentagona* confirms it.

Targioni-Tozzetti's 1886 account is of a very general nature, but will hold the name. In a pamphlet published in Milan in 1890 he gave a scientific description with figures. There is also a description in *Bull. Soc. Ent. Ital.*, xxi, 1890.